



<110> Cole, David
Cummins, Ian
Edwards, Robert

<120> Plant Genes

<130> A33083-PCT-USA 072667.0127

<140> 09/508,710
<141> 2000-07-10

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<151> 1998-09-16

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<212> DNA
<213> Triticum aestivum L.

<220>
<221> CDS
<222> (46)...(711)
<223> Glutathione S transferase

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aag ggg ctg gtg ctg ctg gac ttc tgg gtg agc ccg ttc ggg cag cgc 105
Lys Gly Leu Val Leu Leu Asp Phe Trp Val Ser Pro Phe Gly Gln Arg
5 10 15 20

gtg cgc atc gcg ctg gcc gag aag ggc ctg ccc tac gag tac gcg gag 153
Val Arg Ile Ala Leu Ala Glu Lys Gly Leu Pro Tyr Glu Tyr Ala Glu
25 30 35

gag gac ctg atg gcc ggc aag agc gac cgc ctc ctc cgc gcc aac ccg 201
Glu Asp Leu Met Ala Gly Lys Ser Asp Arg Leu Leu Arg Ala Asn Pro
40 45 50

gtg cat aag aag atc ccg gtg ctc ctc cac gac ggc cgt gcc gtc aac 249

Val	His	Lys	Lys	Ile	Pro	Val	Leu	Leu	His	Asp	Gly	Arg	Ala	Val	Asn		
		55					60					65					
gag	tcc	ctc	atc	atc	ctc	cag	tac	ctg	gag	gag	gcc	ttc	ccg	gac	gcg	297	
Glu	Ser	Leu	Ile	Ile	Leu	Gln	Tyr	Leu	Glu	Glu	Ala	Phe	Pro	Asp	Ala		
	70					75					80						
ccc	gct	ctg	ctc	ccc	tcc	gac	ccc	tac	gcg	cgc	gcg	cag	gcc	cgc	ttc	345	
Pro	Ala	Leu	Leu	Pro	Ser	Asp	Pro	Tyr	Ala	Arg	Ala	Gln	Ala	Arg	Phe		
	85				90					95					100		
tgg	gcc	gac	tac	gtc	gac	aag	aag	gtc	tac	gac	tgc	ggc	tcc	cgc	ctc	393	
Trp	Ala	Asp	Tyr	Val	Asp	Lys	Lys	Val	Tyr	Asp	Cys	Gly	Ser	Arg	Leu		
				105					110					115			
tgg	aag	ctc	aag	ggc	gag	ccg	cag	gcg	cag	gcg	cgc	gcc	gag	atg	ctg	441	
Trp	Lys	Leu	Lys	Gly	Glu	Pro	Gln	Ala	Gln	Ala	Arg	Ala	Glu	Met	Leu		
			120					125					130				
gac	atc	ctc	aag	acc	ctc	gac	ggc	gcg	ctc	ggg	gac	aag	ccc	ttc	ttc	489	
Asp	Ile	Leu	Lys	Thr	Leu	Asp	Gly	Ala	Leu	Gly	Asp	Lys	Pro	Phe	Phe		
		135					140					145					
ggc	ggc	gac	aag	ttc	ggg	ttc	gtc	gac	gcc	gcc	ttc	gcg	ccc	ttc	acc	537	
Gly	Gly	Asp	Lys	Phe	Gly	Phe	Val	Asp	Ala	Ala	Phe	Ala	Pro	Phe	Thr		
	150					155					160						
gcg	tgg	ttc	cac	agc	tac	gag	agg	tac	ggc	gag	ttc	agc	ctg	ccg	gag	585	
Ala	Trp	Phe	His	Ser	Tyr	Glu	Arg	Tyr	Gly	Glu	Phe	Ser	Leu	Pro	Glu		
	165				170					175					180		
gtg	gcg	ccc	aag	atc	gcc	gcg	tgg	gcc	aag	cgc	tgc	ggc	gag	cgg	gag	633	
Val	Ala	Pro	Lys	Ile	Ala	Ala	Trp	Ala	Lys	Arg	Cys	Gly	Glu	Arg	Glu		
				185					190					195			
agc	gtc	gcc	aag	agc	ctc	tac	tcg	ccg	gac	aag	gtg	tac	gac	ttc	atc	681	
Ser	Val	Ala	Lys	Ser	Leu	Tyr	Ser	Pro	Asp	Lys	Val	Tyr	Asp	Phe	Ile		
			200					205					210				
ggc	ctg	ctc	aag	aag	aag	tac	ggc	atc	gag	taggcgcgcc	gacggacgga					731	
Gly	Leu	Leu	Lys	Lys	Lys	Tyr	Gly	Ile	Glu								
	215						220										
cggaacggggcc	atgcaggcga	cagccggccc	gccgtccgga	gggaagcaac	aaataaatca											791	
gggagcgatt	tgggtggcct	acaatgcgta	cgtctggata	gagtatttct	ttctttcttt											851	
cttcgtggaa	taaagtgtct	cgtgtgtgtg	tgggtgggtg	ttgttggttg	gatcagtcag											911	
tgtgtgtggg	tgcgtgttgt	gtactcagta	ctcgtgatgt	gtgtgtgtgt	caatgtgtca											971	
accctgggtct	tcgggtggggg	cagcaccgag	ttgccacctg	ccattccatt	tccattccgg											1031	
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<210> 2
 <211> 222
 <212> PRT

<213> Triticum aestivum L.

<400> 2

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Phe	Gly	Gln	Arg	Val	Arg	Ile	Ala	Leu	Ala	Glu	Lys	Gly	Leu	Pro	Tyr	
			20					25					30			
Glu	Tyr	Ala	Glu	Glu	Asp	Leu	Met	Ala	Gly	Lys	Ser	Asp	Arg	Leu	Leu	
		35				40						45				
Arg	Ala	Asn	Pro	Val	His	Lys	Lys	Ile	Pro	Val	Leu	Leu	His	Asp	Gly	
		50				55					60					
Arg	Ala	Val	Asn	Glu	Ser	Leu	Ile	Ile	Leu	Gln	Tyr	Leu	Glu	Glu	Ala	
65					70					75					80	
Phe	Pro	Asp	Ala	Pro	Ala	Leu	Leu	Pro	Ser	Asp	Pro	Tyr	Ala	Arg	Ala	
			85						90					95		
Gln	Ala	Arg	Phe	Trp	Ala	Asp	Tyr	Val	Asp	Lys	Lys	Val	Tyr	Asp	Cys	
			100					105					110			
Gly	Ser	Arg	Leu	Trp	Lys	Leu	Lys	Gly	Glu	Pro	Gln	Ala	Gln	Ala	Arg	
		115				120						125				
Ala	Glu	Met	Leu	Asp	Ile	Leu	Lys	Thr	Leu	Asp	Gly	Ala	Leu	Gly	Asp	
		130				135					140					
Lys	Pro	Phe	Phe	Gly	Gly	Asp	Lys	Phe	Gly	Phe	Val	Asp	Ala	Ala	Phe	
145					150					155					160	
Ala	Pro	Phe	Thr	Ala	Trp	Phe	His	Ser	Tyr	Glu	Arg	Tyr	Gly	Glu	Phe	
			165						170					175		
Ser	Leu	Pro	Glu	Val	Ala	Pro	Lys	Ile	Ala	Ala	Trp	Ala	Lys	Arg	Cys	
			180					185						190		
Gly	Glu	Arg	Glu	Ser	Val	Ala	Lys	Ser	Leu	Tyr	Ser	Pro	Asp	Lys	Val	
		195					200					205				
Tyr	Asp	Phe	Ile	Gly	Leu	Leu	Lys	Lys	Lys	Tyr	Gly	Ile	Glu			
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<210> 3

<211> 865

<212> DNA

<213> Triticum aestivum L.

<220>

<221> CDS

<222> (54)...(725)

<223> WIC 1

<400> 3

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Met	
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gcg gcg ccg gcg gtg aag gtg tac ggg tgg gcg atg tcg ccg ttc gtg	104
Ala Ala Pro Ala Val Lys Val Tyr Gly Trp Ala Met Ser Pro Phe Val	
5 10 15	
gcg cgc gcg ctg ctg tgc ctg gag gag gcc ggc gtg gag tac gag ctc	152
Ala Arg Ala Leu Leu Cys Leu Glu Glu Ala Gly Val Glu Tyr Glu Leu	

20	25	30	
gtc ccc atg agc cgc gag gcc ggc gac cac cgc cag ccc gac ttc ctc			200
Val Pro Met Ser Arg Glu Ala Gly Asp His Arg Gln Pro Asp Phe Leu			
35	40	45	
gcc cgg aac ccc ttc ggc cag gtc ccc gtt ctc gag gac ggc gac ctc			248
Ala Arg Asn Pro Phe Gly Gln Val Pro Val Leu Glu Asp Gly Asp Leu			
50	55	60	65
acc atc ttc gag tgc cgc gcc gtc gcg agg cac gtg ctg cgc aag cac			296
Thr Ile Phe Glu Ser Arg Ala Val Ala Arg His Val Leu Arg Lys His			
70	75	80	
aaa ccg gag ctg ctg ggc tcc ggc tgc ccg gag tgc gcg gcg atg gtg			344
Lys Pro Glu Leu Leu Gly Ser Gly Ser Pro Glu Ser Ala Ala Met Val			
85	90	95	
gac gtg tgg ctg gag gtg gag gcc cac cag cac cag acc ccg gcg ggc			392
Asp Val Trp Leu Glu Val Glu Ala His Gln His Gln Thr Pro Ala Gly			
100	105	110	
acc atc gtc atg cag tgc atc ctc acc ccg ttc ctc ggc tgc cag cgc			440
Thr Ile Val Met Gln Cys Ile Leu Thr Pro Phe Leu Gly Cys Gln Arg			
115	120	125	
gac cag gcc gcc atc gac gag aac gcg gca aag ctg acg aat ctg ttc			488
Asp Gln Ala Ala Ile Asp Glu Asn Ala Ala Lys Leu Thr Asn Leu Phe			
130	135	140	145
gac gtg tac gag gcg cgc ctg tgc gcg tgc agg tac ctt gcc ggg gag			536
Asp Val Tyr Glu Ala Arg Leu Ser Ala Ser Arg Tyr Leu Ala Gly Glu			
150	155	160	
gcg gtc agc ctc gcg gac ctc agc cac ttc ccg ttc atg cga tac ttc			584
Ala Val Ser Leu Ala Asp Leu Ser His Phe Pro Phe Met Arg Tyr Phe			
165	170	175	
atg gac acc gag tac gcg tgc ctg gtg gag gag cgc ccg cac gtg aag			632
Met Asp Thr Glu Tyr Ala Ser Leu Val Glu Glu Arg Pro His Val Lys			
180	185	190	
gcg tgg tgg gag gag ttc aag gcc agc ccg gcg gcg aag agg gtg acg			680
Ala Trp Trp Glu Glu Phe Lys Ala Ser Pro Ala Ala Lys Arg Val Thr			
195	200	205	
gag ttc atg ccg cca aac ttc ggg ttc gga aag aag gca gag aag			725
Glu Phe Met Pro Pro Asn Phe Gly Phe Gly Lys Lys Ala Glu Lys			
210	215	220	
tgatgacaag aacgaacacc gagcgaacat gttgtgtggt ctgtgcgacc cgaccatggc			785
tcaatgtttt gggctgtttg tgtttcacgc atgaatgaat aaaacaaaat gcttttgggt			845
ttcaaaaaaaaa aaaaaaaaaa			865

<210> 4
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 <212> PRT
 <213> Triticum aestivum L.

<400> 4
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 Val Ala Arg Ala Leu Leu Cys Leu Glu Glu Ala Gly Val Glu Tyr Glu
 20 25 30
 Leu Val Pro Met Ser Arg Glu Ala Gly Asp His Arg Gln Pro Asp Phe
 35 40 45
 Leu Ala Arg Asn Pro Phe Gly Gln Val Pro Val Leu Glu Asp Gly Asp
 50 55 60
 Leu Thr Ile Phe Glu Ser Arg Ala Val Ala Arg His Val Leu Arg Lys
 65 70 75 80
 His Lys Pro Glu Leu Leu Gly Ser Gly Ser Pro Glu Ser Ala Ala Met
 85 90 95
 Val Asp Val Trp Leu Glu Val Glu Ala His Gln His Gln Thr Pro Ala
 100 105 110
 Gly Thr Ile Val Met Gln Cys Ile Leu Thr Pro Phe Leu Gly Cys Gln
 115 120 125
 Arg Asp Gln Ala Ala Ile Asp Glu Asn Ala Ala Lys Leu Thr Asn Leu
 130 135 140
 Phe Asp Val Tyr Glu Ala Arg Leu Ser Ala Ser Arg Tyr Leu Ala Gly
 145 150 155 160
 Glu Ala Val Ser Leu Ala Asp Leu Ser His Phe Pro Phe Met Arg Tyr
 165 170 175
 Phe Met Asp Thr Glu Tyr Ala Ser Leu Val Glu Glu Arg Pro His Val
 180 185 190
 Lys Ala Trp Trp Glu Glu Phe Lys Ala Ser Pro Ala Ala Lys Arg Val
 195 200 205
 Thr Glu Phe Met Pro Pro Asn Phe Gly Phe Gly Lys Lys Ala Glu Lys
 210 215 220

<210> 5
 <211> 930
 <212> DNA
 <213> Triticum aestivum L.

<220>
 <221> CDS
 <222> (60)...(725)
 <223> WIC 2

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 atg gcg ccg gcg gtg aag gtg tac ggg tgg gcc gtg tcg ccg ttc gtg 107
 Met Ala Pro Ala Val Lys Val Tyr Gly Trp Ala Val Ser Pro Phe Val
 1 5 10 15
 gcg cgc cca ctg ctg tgc ctg gag gag gcc ggc gtc gag tac gag ctc 155
 Ala Arg Pro Leu Leu Cys Leu Glu Glu Ala Gly Val Glu Tyr Glu Leu

20	25	30	
gtg tcc atg agc cgc gcg gcc ggc gac cac cgc cag ccg gac ttc ctc Val Ser Met Ser Arg Ala Ala Gly Asp His Arg Gln Pro Asp Phe Leu 35 40 45			203
gcc cgg aac ccc ttc ggc cag gtc ccc gtc ctc gag gac ggc gac ctc Ala Arg Asn Pro Phe Gly Gln Val Pro Val Leu Glu Asp Gly Asp Leu 50 55 60			251
acc ctc ttc gag tcg cgc gcg atc gcg agg cac gtg ctc ccg aag cac Thr Leu Phe Glu Ser Arg Ala Ile Ala Arg His Val Leu Arg Lys His 65 70 75 80			299
aag ccg gag ctg ctg ggc tgc ggc tcg ccg gag gcg gag gcg atg gtg Lys Pro Glu Leu Leu Gly Cys Gly Ser Pro Glu Ala Glu Ala Met Val 85 90 95			347
gac gtg tgg ctg gag gtg gag gcc cac cag tac aac ccc gcg gcc agc Asp Val Trp Leu Glu Val Glu Ala His Gln Tyr Asn Pro Ala Ala Ser 100 105 110			395
gcc atc gtg gtg cag tgc atc atc ttg ccg cta ctg ggc ggc gcg ccg Ala Ile Val Val Gln Cys Ile Ile Leu Pro Leu Leu Gly Gly Ala Arg 115 120 125			443
gac cag gcg gtg gtg gac gag aac gta gcc aag ctc aag aag gtg ctg Asp Gln Ala Val Val Asp Glu Asn Val Ala Lys Leu Lys Lys Val Leu 130 135 140			491
gag gtg tac gag gca cgg ctg tcg gcg tcc agg tac ctc gcc ggg gac Glu Val Tyr Glu Ala Arg Leu Ser Ala Ser Arg Tyr Leu Ala Gly Asp 145 150 155 160			539
gac atc agc ctc gcc gac ctc agc cac ttc ccc ttc acg cgc tac ttc Asp Ile Ser Leu Ala Asp Leu Ser His Phe Pro Phe Thr Arg Tyr Phe 165 170 175			587
atg gag acg gag tac gcg ccg ctg gtg gcg gag ctc ccc cac gtg aac Met Glu Thr Glu Tyr Ala Pro Leu Val Ala Glu Leu Pro His Val Asn 180 185 190			635
gcg tgg tgg gag ggg ctc aag gcc agg ccg gcc gcg agg aag gtg acg Ala Trp Trp Glu Gly Leu Lys Ala Arg Pro Ala Ala Arg Lys Val Thr 195 200 205			683
gag ctc atg ccg ccg gac ctt ggg ctt gga aag aaa gca gag Glu Leu Met Pro Pro Asp Leu Gly Leu Gly Lys Lys Ala Glu 210 215 220			725
tagtgatgac tgccgccaac gttcaccagg atcgagcaag tcaactgtcga gtctccggtt ttcggttgta cggcaccggg gcaccggcct atatcttctg taccagtggc tcgtgttttg atgttttagt ctcacgcttg aataaaatgc aagatatacc catcggttct aaaagaaaaa			785 845 905

aaaaaaaaaa aaaaaaaaaa aaaaaa

930

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<211> 222
<212> PRT
<213> Triticum aestivum L.

<400> 6
Met Ala Pro Ala Val Lys Val Tyr Gly Trp Ala Val Ser Pro Phe Val
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Ala Arg Pro Leu Leu Cys Leu Glu Glu Ala Gly Val Glu Tyr Glu Leu
20 25 30
Val Ser Met Ser Arg Ala Ala Gly Asp His Arg Gln Pro Asp Phe Leu
35 40 45
Ala Arg Asn Pro Phe Gly Gln Val Pro Val Leu Glu Asp Gly Asp Leu
50 55 60
Thr Leu Phe Glu Ser Arg Ala Ile Ala Arg His Val Leu Arg Lys His
65 70 75 80
Lys Pro Glu Leu Leu Gly Cys Gly Ser Pro Glu Ala Glu Ala Met Val
85 90 95
Asp Val Trp Leu Glu Val Glu Ala His Gln Tyr Asn Pro Ala Ala Ser
100 105 110
Ala Ile Val Val Gln Cys Ile Ile Leu Pro Leu Leu Gly Gly Ala Arg
115 120 125
Asp Gln Ala Val Val Asp Glu Asn Val Ala Lys Leu Lys Lys Val Leu
130 135 140
Glu Val Tyr Glu Ala Arg Leu Ser Ala Ser Arg Tyr Leu Ala Gly Asp
145 150 155 160
Asp Ile Ser Leu Ala Asp Leu Ser His Phe Pro Phe Thr Arg Tyr Phe
165 170 175
Met Glu Thr Glu Tyr Ala Pro Leu Val Ala Glu Leu Pro His Val Asn
180 185 190
Ala Trp Trp Glu Gly Leu Lys Ala Arg Pro Ala Ala Arg Lys Val Thr
195 200 205
Glu Leu Met Pro Pro Asp Leu Gly Leu Gly Lys Lys Ala Glu
210 215 220

<210> 7
<211> 927
<212> DNA
<213> Triticum aestivum L.

<220>
<221> CDS
<222> (72)...(707)
<223> WIC 3, WIC 7, and WIC 8

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agtgagaaga g atg gct ccg gtg aag ctg tac ggc gcg acc ctg tcg tgg 110
Met Ala Pro Val Lys Leu Tyr Gly Ala Thr Leu Ser Trp
1 5 10

aac gtc acc agg tgc gtg gcg gcg ctg gag gag gcc ggc gtc cag tac	158
Asn Val Thr Arg Cys Val Ala Ala Leu Glu Glu Ala Gly Val Gln Tyr	
15 20 25	
gag atc gta ccc atc aac ttc ggc acc ggc gag cac aag agc ccc gac	206
Glu Ile Val Pro Ile Asn Phe Gly Thr Gly Glu His Lys Ser Pro Asp	
30 35 40 45	
cac ctc gcc agg aac ccc ttc ggc cag gtg cca gct ttg cag gat ggt	254
His Leu Ala Arg Asn Pro Phe Gly Gln Val Pro Ala Leu Gln Asp Gly	
50 55 60	
gac tta tac gtc ttc gaa tca cgt gct att tgc aag tac gcg tgc cgc	302
Asp Leu Tyr Val Phe Glu Ser Arg Ala Ile Cys Lys Tyr Ala Cys Arg	
65 70 75	
aag aac aag cca gag ctg ttg aag gag ggc gac atc aag gag tca gca	350
Lys Asn Lys Pro Glu Leu Leu Lys Glu Gly Asp Ile Lys Glu Ser Ala	
80 85 90	
atg gtg gat gtg tgg ctc gag gtg gag gcc cat cag tac act gcc gct	398
Met Val Asp Val Trp Leu Glu Val Glu Ala His Gln Tyr Thr Ala Ala	
95 100 105	
ctg agc ccc att ctc ttc gag tgc ctt atc cat cca atg ctt ggg gga	446
Leu Ser Pro Ile Leu Phe Glu Cys Leu Ile His Pro Met Leu Gly Gly	
110 115 120 125	
gcc act gac cag aag gtc atc gac gac aac ctt gtt aag atc aag aac	494
Ala Thr Asp Gln Lys Val Ile Asp Asp Asn Leu Val Lys Ile Lys Asn	
130 135 140	
gtg ctg gcg gtg tac gag gcg cac ctg agc aag tcc aag tac ctg gct	542
Val Leu Ala Val Tyr Glu Ala His Leu Ser Lys Ser Lys Tyr Leu Ala	
145 150 155	
gga gac ttc ctc agt ctt gcg gac ctt aac cat gtg tct gtc acc ctg	590
Gly Asp Phe Leu Ser Leu Ala Asp Leu Asn His Val Ser Val Thr Leu	
160 165 170	
tgc ttg gcg gct aca ccc tat gcg tct ctg ttc gac gcg tac ccg cat	638
Cys Leu Ala Ala Thr Pro Tyr Ala Ser Leu Phe Asp Ala Tyr Pro His	
175 180 185	
gtg aag gcc tgg tgg act gac ctg ctg gcg agg ccg tcc gtc cag aag	686
Val Lys Ala Trp Trp Thr Asp Leu Leu Ala Arg Pro Ser Val Gln Lys	
190 195 200 205	
gtc gca gcg ctg atg aag cca tgatcttaat tgctggtgct cgttcgtcgc	737
Val Ala Ala Leu Met Lys Pro	
210	
gaaataagcc gaggtgtgtg ccccccgatg tgtgcctgta cgagtgtgtg ttcttgtgat	797

gtctcctcgt gttgaatggt caggcttgtg cttgcgatcc tgtctcatct tttactgaaa 857
 tgagcgttcc tatgctctgg ttttaataata aattgtgcct agatattatc tcaaaaaaaaa 917
 aaaaaaaaaa 927

<210> 8
 <211> 212
 <212> PRT
 <213> Triticum aestivum L.

<400> 8
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 20 25 30
 Pro Ile Asn Phe Gly Thr Gly Glu His Lys Ser Pro Asp His Leu Ala
 35 40 45
 Arg Asn Pro Phe Gly Gln Val Pro Ala Leu Gln Asp Gly Asp Leu Tyr
 50 55 60
 Val Phe Glu Ser Arg Ala Ile Cys Lys Tyr Ala Cys Arg Lys Asn Lys
 65 70 75 80
 Pro Glu Leu Leu Lys Glu Gly Asp Ile Lys Glu Ser Ala Met Val Asp
 85 90 95
 Val Trp Leu Glu Val Glu Ala His Gln Tyr Thr Ala Ala Leu Ser Pro
 100 105 110
 Ile Leu Phe Glu Cys Leu Ile His Pro Met Leu Gly Gly Ala Thr Asp
 115 120 125
 Gln Lys Val Ile Asp Asp Asn Leu Val Lys Ile Lys Asn Val Leu Ala
 130 135 140
 Val Tyr Glu Ala His Leu Ser Lys Ser Lys Tyr Leu Ala Gly Asp Phe
 145 150 155 160
 Leu Ser Leu Ala Asp Leu Asn His Val Ser Val Thr Leu Cys Leu Ala
 165 170 175
 Ala Thr Pro Tyr Ala Ser Leu Phe Asp Ala Tyr Pro His Val Lys Ala
 180 185 190
 Trp Trp Thr Asp Leu Leu Ala Arg Pro Ser Val Gln Lys Val Ala Ala
 195 200 205
 Leu Met Lys Pro
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<210> 9
 <211> 866
 <212> DNA
 <213> Triticum aestivum L.

<220>
 <221> CDS
 <222> (45)...(683)
 <223> WIC 5

<400> 9
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 Met Ala Pro Ile
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aag ctg tac ggg atg atg ctg tcg gcc aac gtg acc cgc gtg acc acg	104
Lys Leu Tyr Gly Met Met Leu Ser Ala Asn Val Thr Arg Val Thr Thr	
5 10 15 20	
ctg ctc aac gag ctc ggc ctc gag ttc gac ttc gtc gac gtc gac ctc	152
Leu Leu Asn Glu Leu Gly Leu Glu Phe Asp Phe Val Asp Val Asp Leu	
25 30 35	
cgc acc ggc gcc cac aag cac ccc gac ttc ctc aag ctc aac cct ttc	200
Arg Thr Gly Ala His Lys His Pro Asp Phe Leu Lys Leu Asn Pro Phe	
40 45 50	
ggc cag atc ccc gcg ctg cag gac gga gac gaa gtt gtc ttc gag tcg	248
Gly Gln Ile Pro Ala Leu Gln Asp Gly Asp Glu Val Val Phe Glu Ser	
55 60 65	
cgc gcc atc aac cgg tac atc gcg acc aag tac ggg gcg tcc ctg ctg	296
Arg Ala Ile Asn Arg Tyr Ile Ala Thr Lys Tyr Gly Ala Ser Leu Leu	
70 75 80	
ccg acg ccg tcg gcc aag ctg gag gcg tgg ctg gag gtg gag tcg cac	344
Pro Thr Pro Ser Ala Lys Leu Glu Ala Trp Leu Glu Val Glu Ser His	
85 90 95 100	
cac ttc tac ccg ccg gcg cgg acg ctg gtg tac gag ctg gtc atc aag	392
His Phe Tyr Pro Pro Ala Arg Thr Leu Val Tyr Glu Leu Val Ile Lys	
105 110 115	
ccc atg ctg ggc gcc ccc acc gac gcc gcc gag gtg gac aag aac gcc	440
Pro Met Leu Gly Ala Pro Thr Asp Ala Ala Glu Val Asp Lys Asn Ala	
120 125 130	
gcc gac ctc gcc aag ctg ctc gac gtc tac gag gcc cac ctc gcc gcc	488
Ala Asp Leu Ala Lys Leu Leu Asp Val Tyr Glu Ala His Leu Ala Ala	
135 140 145	
ggg aac aag tac ctg gcc ggc gac gcc ttc ccg ctc gcc gac gcc aac	536
Gly Asn Lys Tyr Leu Ala Gly Asp Ala Phe Pro Leu Ala Asp Ala Asn	
150 155 160	
cac atg tcc tac ctc ttc atg ctc acc aag agc ccc aag gcg gac ctg	584
His Met Ser Tyr Leu Phe Met Leu Thr Lys Ser Pro Lys Ala Asp Leu	
165 170 175 180	
gtg gcc tcc cgc ccg cac gtc aag gcc tgg tgg gag gag atc tcc gcc	632
Val Ala Ser Arg Pro His Val Lys Ala Trp Trp Glu Glu Ile Ser Ala	
185 190 195	
cgc ccc gcc tgg gcc aag acc gtc gcc tcc atc ccc ctc ccg ccc gcc	680
Arg Pro Ala Trp Ala Lys Thr Val Ala Ser Ile Pro Leu Pro Pro Ala	
200 205 210	

gtc tgaggttgct tgtttggtg cggcgagaac ggaataaaat cgcatgatg 733
Val

gaataaaciaa ctttttagag aggaagcttg gaattcttg tgttgctgct gttgaatgtt 793
gaatcttggt gttgaatgtt tacggcacat ctaatttatc cagttttttt ggcgtgaaaa 853
aaaaaaaaaa aaa 866

<210> 10
<211> 213
<212> PRT
<213> Triticum aestivum L.

<400> 10
Met Ala Pro Ile Lys Leu Tyr Gly Met Met Leu Ser Ala Asn Val Thr
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Arg Val Thr Thr Leu Leu Asn Glu Leu Gly Leu Glu Phe Asp Phe Val
20 25 30
Asp Val Asp Leu Arg Thr Gly Ala His Lys His Pro Asp Phe Leu Lys
35 40 45
Leu Asn Pro Phe Gly Gln Ile Pro Ala Leu Gln Asp Gly Asp Glu Val
50 55 60
Val Phe Glu Ser Arg Ala Ile Asn Arg Tyr Ile Ala Thr Lys Tyr Gly
65 70 75 80
Ala Ser Leu Leu Pro Thr Pro Ser Ala Lys Leu Glu Ala Trp Leu Glu
85 90 95
Val Glu Ser His His Phe Tyr Pro Pro Ala Arg Thr Leu Val Tyr Glu
100 105 110
Leu Val Ile Lys Pro Met Leu Gly Ala Pro Thr Asp Ala Ala Glu Val
115 120 125
Asp Lys Asn Ala Ala Asp Leu Ala Lys Leu Leu Asp Val Tyr Glu Ala
130 135 140
His Leu Ala Ala Gly Asn Lys Tyr Leu Ala Gly Asp Ala Phe Pro Leu
145 150 155 160
Ala Asp Ala Asn His Met Ser Tyr Leu Phe Met Leu Thr Lys Ser Pro
165 170 175
Lys Ala Asp Leu Val Ala Ser Arg Pro His Val Lys Ala Trp Trp Glu
180 185 190
Glu Ile Ser Ala Arg Pro Ala Trp Ala Lys Thr Val Ala Ser Ile Pro
195 200 205
Leu Pro Pro Ala Val
210

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<211> 897
<212> DNA
<213> Triticum aestivum L.

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<222> (15) ... (668)
<223> WIC 4 and WIC 10

<221> gene
 <222> (1)...(897)
 <223> WIC 4 cDNA

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                1          5          10

acc aac gtg gcc cgg gtg ctg gtg tgc ctg gag gag gtc ggc gcc gag      98
Thr Asn Val Ala Arg Val Leu Val Cys Leu Glu Glu Val Gly Ala Glu
      15          20          25

tac gag gtg gtc gac atc gat ttc aag gcc atg gag cac aag agc ccc      146
Tyr Glu Val Val Asp Ile Asp Phe Lys Ala Met Glu His Lys Ser Pro
      30          35          40

gag cat ctc gtc aga aac ccg ttc ggc caa atc cct gcc ttc cag gat      194
Glu His Leu Val Arg Asn Pro Phe Gly Gln Ile Pro Ala Phe Gln Asp
      45          50          55          60

ggg gat ctg ctt ctc ttc gag tca cgc gca att gcg agg tac gtg ctc      242
Gly Asp Leu Leu Leu Phe Glu Ser Arg Ala Ile Ala Arg Tyr Val Leu
      65          70          75

cgc aag tac aag aag aac gaa gtg gac ctg ctg agg gaa ggc gac ctc      290
Arg Lys Tyr Lys Lys Asn Glu Val Asp Leu Leu Arg Glu Gly Asp Leu
      80          85          90

aag gag gcg gcg atg gtg gac gta tgg acg gag gtg gac gcg cac acc      338
Lys Glu Ala Ala Met Val Asp Val Trp Thr Glu Val Asp Ala His Thr
      95          100          105

tac aac ccg gcc atc tcg ccg atc gtg tac gag tgc tca tca acc gct      386
Tyr Asn Pro Ala Ile Ser Pro Ile Val Tyr Glu Cys Ser Ser Thr Ala
      110          115          120

cat gcg cgg ctg ccg acc aac caa acg gtg gtg gac gag agc ctg gag      434
His Ala Arg Leu Pro Thr Asn Gln Thr Val Val Asp Glu Ser Leu Glu
      125          130          135          140

aag ctc aag aac gtg ctg gag gtc tac gag gcg cgc ctg tcc aag cac      482
Lys Leu Lys Asn Val Leu Glu Val Tyr Glu Ala Arg Leu Ser Lys His
      145          150          155

gac tac ctc gcc ggg gac ttc gtc agc ttc gcg gac ctc aac cac ttc      530
Asp Tyr Leu Ala Gly Asp Phe Val Ser Phe Ala Asp Leu Asn His Phe
      160          165          170

ccc tac acc ttc tac ttc atg gcc acg ccg cac gcg gcc ctc ttc gac      578
Pro Tyr Thr Phe Tyr Phe Met Ala Thr Pro His Ala Ala Leu Phe Asp
      175          180          185

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tcg tac ccg cac gtc aag gcc tgg tgg gag agg atc atg gcg agg ccg	626
Ser Tyr Pro His Val Lys Ala Trp Trp Glu Arg Ile Met Ala Arg Pro	
190 195 200	

gcc gtg aag aag ctc gcc gcg cag atg gtt ccc aag aag ccg	668
Ala Val Lys Lys Leu Ala Ala Gln Met Val Pro Lys Lys Pro	
205 210 215	

tgatttgcta ggcgggatct cgcacgtgg gatccgattc cgatcactga tctgtgtggc	728
gttttctttt cttgttggtg tcgcgaataa ggcaaatgag ctcgtgtgtg tgtggctgga	788
attgcaccag cgtgcagttt ttgcgctttg cgtgtgtgtg gtcgtgaaaa ctcttgagat	848
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 <213> Triticum aestivum L.

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		20						25					30						
Asp	Ile	Asp	Phe	Lys	Ala	Met	Glu	His	Lys	Ser	Pro	Glu	His	Leu	Val				
		35					40					45							
Arg	Asn	Pro	Phe	Gly	Gln	Ile	Pro	Ala	Phe	Gln	Asp	Gly	Asp	Leu	Leu				
	50				55						60								
Leu	Phe	Glu	Ser	Arg	Ala	Ile	Ala	Arg	Tyr	Val	Leu	Arg	Lys	Tyr	Lys				
65				70					75					80					
Lys	Asn	Glu	Val	Asp	Leu	Leu	Arg	Glu	Gly	Asp	Leu	Lys	Glu	Ala	Ala				
			85					90					95						
Met	Val	Asp	Val	Trp	Thr	Glu	Val	Asp	Ala	His	Thr	Tyr	Asn	Pro	Ala				
		100						105					110						
Ile	Ser	Pro	Ile	Val	Tyr	Glu	Cys	Ser	Ser	Thr	Ala	His	Ala	Arg	Leu				
	115					120					125								
Pro	Thr	Asn	Gln	Thr	Val	Val	Asp	Glu	Ser	Leu	Glu	Lys	Leu	Lys	Asn				
	130				135						140								
Val	Leu	Glu	Val	Tyr	Glu	Ala	Arg	Leu	Ser	Lys	His	Asp	Tyr	Leu	Ala				
145				150				155						160					
Gly	Asp	Phe	Val	Ser	Phe	Ala	Asp	Leu	Asn	His	Phe	Pro	Tyr	Thr	Phe				
			165					170					175						
Tyr	Phe	Met	Ala	Thr	Pro	His	Ala	Ala	Leu	Phe	Asp	Ser	Tyr	Pro	His				
		180					185						190						
Val	Lys	Ala	Trp	Trp	Glu	Arg	Ile	Met	Ala	Arg	Pro	Ala	Val	Lys	Lys				
	195				200						205								
Leu	Ala	Ala	Gln	Met	Val	Pro	Lys	Lys	Pro										
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<210> 13
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 <212> DNA
 <213> Triticum aestivum L.

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<223> TA 27 cDNA
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Met Glu Pro Met Lys Val Tyr Gly Trp Ala Val															
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tcg cca tgg atg gcg cgg gtc ctc gtc tcc ctg gag gag gcc gcc gcc															101
Ser Pro Trp Met Ala Arg Val Leu Val Ser Leu Glu Glu Ala Gly Ala															
15 20 25															
gac tac gag ctc gtg ccc atg agc cgc aac ggc ggc gac cac cgg cgg															149
Asp Tyr Glu Leu Val Pro Met Ser Arg Asn Gly Gly Asp His Arg Arg															
30 35 40															
ccg gag cac ctc gcc aga aac ccc ttc ggt gag atc ccg gtg ctc gaa															197
Pro Glu His Leu Ala Arg Asn Pro Phe Gly Glu Ile Pro Val Leu Glu															
45 50 55															
tac ggc ggt ctg acg ctt tac caa tcc cgc gcc att gca agg cat att															245
Tyr Gly Gly Leu Thr Leu Tyr Gln Ser Arg Ala Ile Ala Arg His Ile															
60 65 70 75															
ctc cgc aaa cac aag ccc ggg ctt cta gga gca ggc agc ctc gag gag															293
Leu Arg Lys His Lys Pro Gly Leu Leu Gly Ala Gly Ser Leu Glu Glu															
80 85 90															
tcg gcg atg gtg gat gta tgg gtc gac gtg gat gcc cac cac ctg gag															341
Ser Ala Met Val Asp Val Trp Val Asp Val Asp Ala His His Leu Glu															
95 100 105															
ccc gta ctc aag ccc atc gtg tgg aac tgc atc atc aac ccg ttc gtc															389
Pro Val Leu Lys Pro Ile Val Trp Asn Cys Ile Ile Asn Pro Phe Val															
110 115 120															
ggg agg gac gtc gac cag ggc ctc gtc gat gag agc gtc gag aag ctc															437
Gly Arg Asp Val Asp Gln Gly Leu Val Asp Glu Ser Val Glu Lys Leu															
125 130 135															
aag aag ctg ctg gag gtg tac gag gca aga ctg tca agc aac aag tac															485
Lys Lys Leu Leu Glu Val Tyr Glu Ala Arg Leu Ser Ser Asn Lys Tyr															
140 145 150 155															
ttg gcc ggg gat ttc gtc agc ttc gcc gac ctc acc cat ttc tcc ttc															533
Leu Ala Gly Asp Phe Val Ser Phe Ala Asp Leu Thr His Phe Ser Phe															
160 165 170															

atg cgc tac ttc atg gcg acg gag cat gcg gtt gtg ctc gat gcg tat	581
Met Arg Tyr Phe Met Ala Thr Glu His Ala Val Val Leu Asp Ala Tyr	
175 180 185	

ccg cat gtg aag gca tgg tgg aag gcg ctg ctg gca agg cca tcg gtc	629
Pro His Val Lys Ala Trp Trp Lys Ala Leu Leu Ala Arg Pro Ser Val	
190 195 200	

aag aag gtg ata gct ggc atg cct ccg gat ttt gga ttc ggg agc ggg	677
Lys Lys Val Ile Ala Gly Met Pro Pro Asp Phe Gly Phe Gly Ser Gly	
205 210 215	

aga ata cca tgataaagca tgcttggttg tctatgatgc tctga	721
Arg Ile Pro	
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 <213> Triticum aestivum L.

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			20					25					30						
Pro	Met	Ser	Arg	Asn	Gly	Gly	Asp	His	Arg	Arg	Pro	Glu	His	Leu	Ala				
		35				40						45							
Arg	Asn	Pro	Phe	Gly	Glu	Ile	Pro	Val	Leu	Glu	Tyr	Gly	Gly	Leu	Thr				
	50					55					60								
Leu	Tyr	Gln	Ser	Arg	Ala	Ile	Ala	Arg	His	Ile	Leu	Arg	Lys	His	Lys				
65					70					75					80				
Pro	Gly	Leu	Leu	Gly	Ala	Gly	Ser	Leu	Glu	Glu	Ser	Ala	Met	Val	Asp				
				85					90				95						
Val	Trp	Val	Asp	Val	Asp	Ala	His	His	Leu	Glu	Pro	Val	Leu	Lys	Pro				
			100					105					110						
Ile	Val	Trp	Asn	Cys	Ile	Ile	Asn	Pro	Phe	Val	Gly	Arg	Asp	Val	Asp				
		115					120					125							
Gln	Gly	Leu	Val	Asp	Glu	Ser	Val	Glu	Lys	Leu	Lys	Lys	Leu	Leu	Glu				
	130					135					140								
Val	Tyr	Glu	Ala	Arg	Leu	Ser	Ser	Asn	Lys	Tyr	Leu	Ala	Gly	Asp	Phe				
145					150					155					160				
Val	Ser	Phe	Ala	Asp	Leu	Thr	His	Phe	Ser	Phe	Met	Arg	Tyr	Phe	Met				
				165					170					175					
Ala	Thr	Glu	His	Ala	Val	Val	Leu	Asp	Ala	Tyr	Pro	His	Val	Lys	Ala				
			180					185					190						
Trp	Trp	Lys	Ala	Leu	Leu	Ala	Arg	Pro	Ser	Val	Lys	Lys	Val	Ile	Ala				
		195					200					205							
Gly	Met	Pro	Pro	Asp	Phe	Gly	Phe	Gly	Ser	Gly	Arg	Ile	Pro						
	210					215					220								

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 <212> DNA
 <213> Triticum aestivum L.

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 <221> CDS
 <222> (66)...(764)
 <223> Glutathione S transferase

<221> gene
 <222> (1)...(926)
 <223> cDNA clone ICR

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 Met Ala Gly Asp Ser Gly Glu Leu Lys Leu Gly Val Trp Thr Ser
 1 5 10 15

ccg ttc gtc atc agg gtg cgc gtg gtg ctc aac ctc aag tcg ctg ccg 158
 Pro Phe Val Ile Arg Val Arg Val Val Leu Asn Leu Lys Ser Leu Pro
 20 25 30

tac gag tac gtg gag gag agc ctg ggc agc aag agc gcg ctc ctc ctg 206
 Tyr Glu Tyr Val Glu Glu Ser Leu Gly Ser Lys Ser Ala Leu Leu Leu
 35 40 45

ggc tcc aac ccg gtg cac cag agc gtg ccc gtc ctc ctc cac ggc ggc 254
 Gly Ser Asn Pro Val His Gln Ser Val Pro Val Leu Leu His Gly Gly
 50 55 60

cgc ccc gtg aac gag tcc cag gtc atc gtg cag tac atc gac gag gtc 302
 Arg Pro Val Asn Glu Ser Gln Val Ile Val Gln Tyr Ile Asp Glu Val
 65 70 75

tgg gcg ggg gcc ggc ccg tcc gtg ctc ccg gcc gac ccc tac gag cgc 350
 Trp Ala Gly Ala Gly Pro Ser Val Leu Pro Ala Asp Pro Tyr Glu Arg
 80 85 90 95

gcc acg gcg cgc ttc tgg gcg gcg tac gtc gac gac aag gtc ggg tcg 398
 Ala Thr Ala Arg Phe Trp Ala Ala Tyr Val Asp Asp Lys Val Gly Ser
 100 105 110

gcg tgg acg ggg atg ctc ttc tcg tgc aag acg gag gag gag cgg gcg 446
 Ala Trp Thr Gly Met Leu Phe Ser Cys Lys Thr Glu Glu Glu Arg Ala
 115 120 125

gag gcg gtg tcc ccg gcc gtg gcg gcg ctg gag acc ctg gag ggc gcg 494
 Glu Ala Val Ser Arg Ala Val Ala Ala Leu Glu Thr Leu Glu Gly Ala
 130 135 140

ttc gcg gag tgc tcc aag ggg aag gcg ttc ttc ggc ggc gac gcc atc 542

Phe	Ala	Glu	Cys	Ser	Lys	Gly	Lys	Ala	Phe	Phe	Gly	Gly	Asp	Ala	Ile		
145						150					155						
ggg	ttc	gtc	gac	gtc	gtg	ctt	ggc	ggc	tac	ctc	ggc	tgg	ttc	ggc	gcg	590	
Gly	Phe	Val	Asp	Val	Val	Leu	Gly	Gly	Tyr	Leu	Gly	Trp	Phe	Gly	Ala		
160					165				170					175			
atc	gac	aag	atc	atc	ggg	cgc	cgg	ctg	atc	gac	ccg	gcg	agg	acg	ccg	638	
Ile	Asp	Lys	Ile	Ile	Gly	Arg	Arg	Leu	Ile	Asp	Pro	Ala	Arg	Thr	Pro		
				180				185						190			
ctg	ctg	gcc	agg	tgg	gag	gag	cgg	ttc	cgc	gcg	gcg	gac	gcg	gcc	aag	686	
Leu	Leu	Ala	Arg	Trp	Glu	Glu	Arg	Phe	Arg	Ala	Ala	Asp	Ala	Ala	Lys		
			195				200					205					
ggc	gtc	gtg	ccg	gac	gac	gcc	gac	aag	atg	ctc	gag	ttc	ttg	ccc	acc	734	
Gly	Val	Val	Pro	Asp	Asp	Ala	Asp	Lys	Met	Leu	Glu	Phe	Leu	Pro	Thr		
	210					215				220							
gtg	ctc	gct	tgg	atc	gcc	ggc	aaa	gcg	aag	tgaactgtgt	ctgtgaggcc	784					
Val	Leu	Ala	Trp	Ile	Ala	Gly	Lys	Ala	Lys								
	225					230											
gtgacatcgc	cagctcgtga	catgtgtgtt	tgtgtgtgtc	tgagtcgctc	cagtgtgtgc	844											
tgaataaatg	caccgcatgt	cgtgtgttgt	accaagggca	aacaatgctg	aataattttg	904											
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 <213> Triticum aestivum L.

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			20					25					30		
Glu	Tyr	Val	Glu	Glu	Ser	Leu	Gly	Ser	Lys	Ser	Ala	Leu	Leu	Leu	Gly
		35					40					45			
Ser	Asn	Pro	Val	His	Gln	Ser	Val	Pro	Val	Leu	Leu	His	Gly	Gly	Arg
	50					55				60					
Pro	Val	Asn	Glu	Ser	Gln	Val	Ile	Val	Gln	Tyr	Ile	Asp	Glu	Val	Trp
65					70					75				80	
Ala	Gly	Ala	Gly	Pro	Ser	Val	Leu	Pro	Ala	Asp	Pro	Tyr	Glu	Arg	Ala
				85					90					95	
Thr	Ala	Arg	Phe	Trp	Ala	Ala	Tyr	Val	Asp	Asp	Lys	Val	Gly	Ser	Ala
			100					105					110		
Trp	Thr	Gly	Met	Leu	Phe	Ser	Cys	Lys	Thr	Glu	Glu	Glu	Arg	Ala	Glu
		115					120					125			
Ala	Val	Ser	Arg	Ala	Val	Ala	Ala	Leu	Glu	Thr	Leu	Glu	Gly	Ala	Phe
	130					135					140				
Ala	Glu	Cys	Ser	Lys	Gly	Lys	Ala	Phe	Phe	Gly	Gly	Asp	Ala	Ile	Gly
145					150					155					160

gct cgc ttc tgg gcc gcc tat gtg aac gac aag ctg ttc cct tcg tgc	392
Ala Arg Phe Trp Ala Ala Tyr Val Asn Asp Lys Leu Phe Pro Ser Cys	
105 110 115	
acc ggg atc ctc aag act acg aag cag gag gag aga gcc ggt aag atg	440
Thr Gly Ile Leu Lys Thr Thr Lys Gln Glu Glu Arg Ala Gly Lys Met	
120 125 130	
gag gag acc ctg tcc ggg ctc aga cac tta gaa gct gtc atg gcg gag	488
Glu Glu Thr Leu Ser Gly Leu Arg His Leu Glu Ala Val Met Ala Glu	
135 140 145 150	
tgc tcc gaa ggg gag gcg gag gcg ccg ttc ttc ggt ggt gac gcc atc	536
Cys Ser Glu Gly Glu Ala Glu Ala Pro Phe Phe Gly Gly Asp Ala Ile	
155 160 165	
ggg ttc ctc gac atc gcg ctc ggg tgc tat ctt ccc tgg ttt gag gca	584
Gly Phe Leu Asp Ile Ala Leu Gly Cys Tyr Leu Pro Trp Phe Glu Ala	
170 175 180	
gca ggc cgc ctg gcc ggc ttg ggg ccg atc atc gac ccg gcg agg acg	632
Ala Gly Arg Leu Ala Gly Leu Gly Pro Ile Ile Asp Pro Ala Arg Thr	
185 190 195	
ccg aaa cta gct gcg tgg gcg gag ccg ttc agc gtc gcc gag ccg atc	680
Pro Lys Leu Ala Ala Trp Ala Glu Arg Phe Ser Val Ala Glu Pro Ile	
200 205 210	
aag gcg ctg ctg cct ggg gtc gac aag ctg gag gag tac atc act acg	728
Lys Ala Leu Leu Pro Gly Val Asp Lys Leu Glu Glu Tyr Ile Thr Thr	
215 220 225 230	
gcg ctt tat cca aag tgg aac atc gcg gtc acc ggc aac taattaaaga	777
Ala Leu Tyr Pro Lys Trp Asn Ile Ala Val Thr Gly Asn	
235 240	
tcttgtcggtt ccactatggc aaaagaaata aaaaagggcg tcgttcgata accggcggag	837
gatctctgcc ttgtgagtag ctgttttcac gtcaagagtt gaactgttac tactaagtcg	897
ggtttctttt tgcgagggtt agtgggtcgt ggatcatgaat aatgcacagg cgtgcactct	957
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<210> 18

<211> 243

<212> PRT

<213> Triticum aestivum L.

<400> 18

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20 25 30

Leu Ser Tyr Asp Tyr Leu Pro Glu Asp Arg Trp Ser Thr Ser Asp Leu
 35 40 45
 Leu Ile Ala Ser Asn Pro Val Tyr Lys Lys Val Pro Val Leu Ile His
 50 55 60
 Asn Gly Arg Pro Val Cys Glu Ser Leu Leu Ile Leu Glu Tyr Leu Asp
 65 70 75 80
 Asp Ala Val Gly Leu Ala Gly Asn Gly Lys Pro Ile Leu Pro Ala Asp
 85 90 95
 Pro Tyr Ser Arg Ala Val Ala Arg Phe Trp Ala Ala Tyr Val Asn Asp
 100 105 110
 Lys Leu Phe Pro Ser Cys Thr Gly Ile Leu Lys Thr Thr Lys Gln Glu
 115 120 125
 Glu Arg Ala Gly Lys Met Glu Glu Thr Leu Ser Gly Leu Arg His Leu
 130 135 140
 Glu Ala Val Met Ala Glu Cys Ser Glu Gly Glu Ala Glu Ala Pro Phe
 145 150 155 160
 Phe Gly Gly Asp Ala Ile Gly Phe Leu Asp Ile Ala Leu Gly Cys Tyr
 165 170 175
 Leu Pro Trp Phe Glu Ala Ala Gly Arg Leu Ala Gly Leu Gly Pro Ile
 180 185 190
 Ile Asp Pro Ala Arg Thr Pro Lys Leu Ala Ala Trp Ala Glu Arg Phe
 195 200 205
 Ser Val Ala Glu Pro Ile Lys Ala Leu Leu Pro Gly Val Asp Lys Leu
 210 215 220
 Glu Glu Tyr Ile Thr Thr Ala Leu Tyr Pro Lys Trp Asn Ile Ala Val
 225 230 235 240
 Thr Gly Asn

<210> 19

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligonucleotide primer to introduce NdeI site into translation start site of ICJ

<400> 19

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